

WHAT IS CLAIMED IS:

1. A communications system that comprises:

a subscriber modem;
a central office modem; and

5 a communications channel coupled between the subscriber modem and the central office modem and configured to transport uplink signals from the subscriber modem to the central office modem, and further configured to transport downlink signals from the central office modem to the subscriber modem,

10 wherein the power spectral density of the transmitted uplink signals is proportional to the power spectral density of the transmitted downlink signals.

2. A communications system that comprises:

a subscriber modem;
15 a central office modem; and

a communications channel coupled between the subscriber modem and the central office modem and configured to transport uplink signals from the subscriber modem to the central office modem, and further configured to transport downlink signals from the central office modem to the subscriber modem,

20 wherein at frequencies below a selected frequency M_{E2F} , the power spectral density of the transmitted uplink signals is proportional to the power spectral density of the transmitted downlink signals by a positive scale factor, and

25 wherein at frequencies above M_{E2F} , the power spectral density of the uplink signals are limited to one or more uplink frequency bands and the downlink signals are limited to one or more downlink frequency bands that are disjoint from the uplink frequency bands, and wherein the total bandwidth of the uplink frequency bands is proportional to the total bandwidth of the downlink frequency bands by the same positive scale factor.

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3. A communications system that comprises:

a subscriber modem;

a central office modem; and

a communications channel coupled between the subscriber modem and the central office modem and configured to transport uplink signals from the subscriber modem to the central office modem, and further configured to transport downlink signals from the central office modem to the subscriber modem,

wherein when the connection is initialized, frequency bands are allocated to the uplink and downlink power signals so that the total uplink and downlink capacity is maximized over the channel for predetermined uplink and downlink average signal powers,

wherein the predetermined uplink and downlink average powers are unequal.